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a wide vertical range, and bearing out Dr. White's view, that the Devonian of Iowa belongs to a single epoch, probably the Hamilton. In the *Amer. Journ. of Science*, for April, p. 311, Professor Williams, in a note, acknowledged that he was wrong in speaking of the rocks of Lime creek, Iowa, as referred by Western geologists to the Kinderhook group, but maintained his view, that its fauna was represented in N. Y., at the base of the Chemung.

Wisconsin.—Vol. IV, Part III, of the Geological Survey of Wisconsin, contains descriptions of fossils, by R. P. Whitfield, illustrated by 27 plates of very good figures; some of the species are new, but most of them have already been described; the fossils described are not offered as a complete representation of the fauna of the several geological horizons of the State, but only as a few of the more prominent known species, together with some of the most characteristic new ones of the several localities from which they have been obtained; the volume also contains a general list of the fossils recognized within the State, including those described, and showing the formation in which they occur, which are the Potsdam, Lower Magnesian, Trenton, Galena, Hudson River, Niagara, Guelph, Lower Helderberg, and Hamilton. Professor Whitfield calls attention to the marked differentiation of the species of the Potsdam in different localities, according to the change in the lithological character of the matrix.

The first volume of the Wisconsin Geological Survey, which has been the last to appear, also contains a list of Wisconsin fossils, and in the general geology contained in the report, there are a large number of figures, many of which are reproductions of Professor Whitfield's plates; the other figures are compiled from various sources, and answer their purpose for a school text-book fairly well.

If those who notice them, will kindly call my attention to any omissions, I will insert them in next year's review, as it is intended to make this record as complete as possible.

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EDITORS' TABLE.

EDITORS: A. S. PACKARD, JR., AND E. D. COPE.

—— Professor Martin's address at the opening of the new biological institute at Baltimore, lately published in *Science*, calls attention emphatically to the lack of consideration and support given to physiology in this country. This science is the basis of all sound medical practice, and the time cannot now be far distant when every reputable medical school will be forced to seek a professional physiologist to enroll among its professors. Few departments of science have changed more fundamentally within recent years than physiology. It is not long since it was barely more than a series of anatomical deductions enriched by a slight knowledge of the functions of organs, whereas it is now an exact and experimental science, which employs both the apparatus of the physicist and the reagents of the chemist as well as many instruments adapted to its own special needs, and which can be carried on only in the laboratory. Dr. H. P. Bowditch established at the Harvard Medical School the first well-equipped physiological laboratory in the country, and the example then set has since been followed elsewhere. It is to be hoped that the ample endowment of the Johns Hopkins University will be in part used to enable Professor Martin to develop his laboratory to the highest standard, and that it may exert a far-reaching influence towards promoting not only pure but also medical science, so that it may never fall behind its competitors, but become the worthy compeer of the Harvard laboratory. But while we welcome the auspicious opening of this department of the young university at Baltimore, we cannot escape a feeling of regret that the professor of biology, instead of aiming first at a secure position in medical physiology, even at the sacrifice of much else in biology, should not have fixed upon a higher ideal more worthy of a great university. Morphology, botany, general physiology and biology are all to wait, content to be the handmaidens of medical physiology. The magnificent opportunity to accomplish the immediate development of a school of scientific biology has been deliberately renounced. We deplore what we consider a serious mistake, and are unable to justify the postponement of proper university work in order to favor one class of professional men. Professor Martin's address must, we fear, disappoint many of the high hopes raised by the early aspirations of the Johns Hopkins University. It is too explicit a statement of a purpose too one-sided.

—— For many years a number of the scientific members of the Philadelphia Academy of Natural Sciences have endeavored to preserve the institution for the use of a high standard of original research. They long since foresaw what has many times been demonstrated, that its present organization means destruction to all important scientific work, and the substitution therefor of the mediocrity of the debating society. They have seen the inevitable amateurism of an unlimited membership gradually asserting itself in a neglect of the principal sources of scientific prosperity. With inconceivable apathy a few of the scientists of the academy have permitted this state of things to continue, when a little activity on their part would have turned the scales in favor of reform. Little help in this direction has been derived from outside the institution, for the public at large do not know the meaning of the words "original research," nor the importance of the ends attainable by it. Recently one or two of the younger specialists, imagining that their personal interest will be better served by joining the "popular" element, have abandoned the project of reform. This action on their part settles the near future of the institution. The only anxiety we feel is lest it receive gifts of money which may not be specifically applied to purposes of original research. If the use of such gifts be not so designated, they will not be directed to the uses for which the academy was created.

In view of this indefinite postponement of the development of this institution, various substitutes are now agitating the minds of some Philadelphians. One proposition is the creation of a school of biology, where research and teaching may be combined in a laboratory. Discussion of this plan has resulted in its adoption by some of the friends of the University of Pennsylvania, and there is considerable ground for hope that such a department of biological research, in connection with that institution, will receive an endowment. One objectionable feature in this scheme is the proposed directorship by one man. There should rather be several directors or professors, each in charge of a department. One man will necessarily be biased in the direction of his own specialty, and others will be more or less neglected. It is true that the chairs necessary for the conduct of a biological school exist in the academy, but so long as their occupants are excluded from the council of that body, competent men cannot be expected to hold them permanently.

Another organization is suggested, which shall represent in this State and city the academies of science of other countries. About twenty men are now living in this State who are distinguished for original researches in various fields of pure science. Such a body would supply a felt want, and its management would be free from the objectionable features which depress the prosperity of existing institutions. It would not probably be long without both museum and library. It is well known that the Academy of Natural Sciences is not likely to be the recipient of important collections under its present organization. It is also true that the publications of the leading twenty scientific men of Pennsylvania would secure a magnificent return in exchanges for its library.

—— We inform interested persons, that the NATURALIST does not publish long obituaries; also, that no obituary notices of scientific men of a length of a page or less, has ever been declined by its editors.

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RECENT LITERATURE.

RYDER'S OBSERVATIONS ON EMBRYO FISHES.[1] — The Bulletin of the United States Fish Commission contains a series of articles upon various matters connected with the development of fishes, embodying the results of the investigations of Mr. J. A. Ryder during the year 1882.

The mode of absorption of the yolk of the embryo shad differs in the absence of a vitelline circulation from that which obtains in Tylosurus (Belone), Fundulus, Esox, and Salmo. The great mass of the yolk in the shad embryo consists of coarse, irregular masses of very clear protoplasmic matter, separated by a protoplasm which is optically different. The covering of the yolk is a palish amber-colored layer, quite different from the clear body of the yolk, and usually thicker at the end next the heart. The intestine lies in a longitudinal furrow on the dorsal aspect of the yolk-sac, and is never connected with it in this species. The yolk-sac is surrounded by a space filled with serous fluid. This space is capacious anteriorly, between the heart and the yolk, and this part is identified by Mr. Ryder with the segmentation cavity. The delicate pericardial membrane that separates this cavity from the pericardial space may, possibly, be perforate. In Tylosurus the two cavities are certainly connected. The heart opens freely into the segmentation cavity, and the appearance presented is that its persistent pulsation breaks up the yolk-substance into small spherules, sucks them out of the segmentation cavity, and carries them into the body of the embryo. The corpuscles develop on the surface of the outer yolk-layer, and after a while drop into the serous fluid, appearing like the white blood cells of human blood. As development proceeds, the yolk-sac becomes pointed in front, and the external layer becomes thicker, while the pericardial membrane becomes funnel-shaped to fit the anterior part of the yolk-mass. Before the final disappearance of the yolk, the liver of the young fish becomes more developed, and the portal vein makes its way over the dorsal aspect of the yolk towards the venous end of the heart. As the peculiar amber layer around the yolk persists to the last, it is probable that the central clear portion is transformed gradually into it.

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[1] *Bulletin of the United States Fish Commission.*—Observations on the absorption of the yolk, the food, feeding, and development of embryo fishes, comprising some investigations conducted at the Central Hatchery, Armory Building, D.C., in 1882, pp. 179–205.